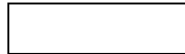


The Crash of TWA Flight 800

(b) (3)

~~SECRET~~Solving the Mystery of the "Missile Sightings"**The Crash of TWA Flight 800 (U)**

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Capt. David McClaine of
Eastwind Airlines,
piloting a Boeing 737
commuter flight near the
coast of Long Island, had
just become the first
recorded eyewitness to
one of the most deadly
and mysterious
commercial air crashes
in US aviation history.
”

is a senior weapons analyst in the Directorate of Intelligence. He received the Intelligence Medal of Merit for his participation in the work described in this article.



"We just saw an explosion out here on Stinger Bee five oh seven."

It was Wednesday, 17 July 1996, 8:31:51 p.m. Capt. David McClaine of Eastwind Airlines, piloting a Boeing 737 commuter flight near the coast of Long Island, had just become the first recorded eyewitness to one of the most deadly and mysterious commercial air crashes in US aviation history. It would be almost a minute before the importance of what McClaine had seen would become clear to the Boston air traffic controller with whom he was speaking.

8:31:57: *"Stinger Bee five oh seven, I'm sorry. I missed it. Ah, you're on eighteen. Did you say something else?"*

8:32:01: *"We just saw an explosion up ahead of us here something (like) about sixteen thousand feet (altitude) or something like that. It just went down—to the water."*

Within seconds, other pilots in the vicinity corroborated McClaine's observation.

8:32:25: *"Boston, Virgin zero zero nine. I can confirm that, out of my, my nine o'clock position, we just had an ex... it looked like an explosion about five miles away, six miles away."*

Up and down the coast of Long Island, and from vantage points as far as 40 miles away in Connecticut, beachgoers, pleasure boaters, construction workers, diners, and

others made similar sightings. And from more than 22,000 miles overhead, a military satellite had detected heat from something in the vicinity.

But it would be hours, sometimes days or weeks, before these observations would be assimilated into the official record. For now, the scope of what had happened was unfolding before a very few.

8:32:56: *"TWA eight hundred, (call) Center."*

It was now 65 seconds after McClaine's first sighting. The controller at Boston Air Route Traffic Control Center, coordinating the flights of the dozen or so aircraft in the vicinity, had noticed one was missing from his radar screen. In a professional but increasingly urgent tone, the controller was trying to elicit a response.

8:33:04: *"TWA eight hundred, Center."*

TWA Flight 800, a Boeing 747 jumbo jet, had departed New York's John F. Kennedy airport 14 minutes earlier. It was en route to Paris with 230 passengers and crew. In his last contact with Boston Center at 8:30:17, Capt. Ralph Kevorkian, a pilot with 21 years experience flying for TWA, acknowledged clearance from the Boston Center controller to climb to 15,000 feet. But now the plane was nowhere to be seen.

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 DATE: APR 2006

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TWA Flight 800

8:33:09: "TWA eight hundred, if you hear Center ident[ify]."

The Boston controller was becoming increasingly uneasy, as were pilots in the area. [redacted]

8:33:36, from Alitalia 609: "...just for your information, sir, we are just overhead the explosion, right overhead at this time."

8:33:48, from McClaine: "Stinger Bee, ah, Boston, we are directly over the site where that airplane or whatever it was just exploded and went into the water."

8:34:01, from Boston Center: "Roger that. Thank you very much, sir, we're investigating that right now. TWA eight hundred, Center. TWA eight zero zero, if you hear Center, ident."

8:35:36, again from Boston: "TWA eight hundred, Center."

The gravity of the situation was now evident to all in the small group privy to the interchange that had begun four minutes earlier. [redacted]

8:35:43, from McClaine: "I think that was him."

8:35:45, from Boston: "I think so."

8:35:48, from McClaine: "God bless him."

CIA Participation

The crash of TWA Flight 800, potentially one of the most lethal international terrorist acts ever per-

petrated against the United States, touched off the most extensive, complex, and costly air disaster investigation in US history. Had it been the result of state-sponsored terrorism, it would have been considered an act of war. [redacted]

FBI and National Transportation Safety Board (NTSB) investigators almost immediately focused on three possible causes: a bomb, a missile, or a mechanical failure. The missile theory seemed particularly plausible because of reports from dozens of eyewitnesses in the Long Island area who, on the evening of 17 July, recalled seeing something resembling a flare or firework ascend and culminate in an explosion. [redacted]

Because of the possibility that international terrorists may have been involved, the FBI requested CIA's assistance. In accordance with the National Security Act of 1947 and Executive Order 12333, the CIA responded to the FBI's request within 24 hours of the crash. This support consisted primarily of help from the Counternormist Center in the Directorate of Operations and from a small group of analysts, including myself, in the Office of Weapons, Technology and Proliferation (now the Office of Transnational Issues, or OTI) in the Directorate of Intelligence. Following a preliminary review of radar and satellite data, the OTI analysts focused on detailed analysis of eyewitness statements provided by the FBI. After eight months of work, they concluded with confidence and full substantiation that the eyewitnesses had not seen a missile. On 28 March 1997, CIA's Deputy

Director for Intelligence sent a memorandum to FBI Assistant Director James Kallstrom summarizing the results:

Our analysis demonstrates that the eyewitness sightings of greatest concern to us—the ones originally interpreted to be of a possible missile attack—took place after the first of several explosions aboard the aircraft. Combined with the total absence of physical evidence of a missile attack, this leads CIA analysts to conclude that no such attack occurred.

These findings also were documented in an unclassified video produced with the aid of animation experts and the Directorate of Intelligence's Video/Multimedia Production Center. [redacted]

The FBI and others involved in the investigation ultimately concurred with the CIA's conclusions. On 18 November 1997, Kallstrom aired the CIA video in its entirety during a national news conference announcing the suspension of the worldwide criminal probe. [redacted]

We feel very, very comfortable that what [the CIA] videotape portrays is very close...to what happened. The tape was made to explain, first to [the FBI], and then to the public, and the families, and the naysayers...and anyone else out there—the aeronautical engineers—what these 244 people saw. What is the explanation? If they didn't see a missile, what could they have seen? All 244 witnesses saw events

The Crash of TWA Flight 800

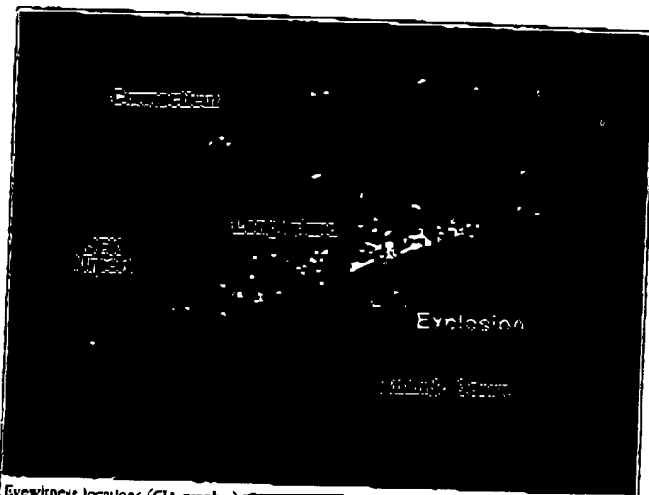
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TWA Flight 800

that happened after—after—the
Center fuel tank blew up. So they
did not see a missile attacking the
plane. [redacted]

—FBI Assistant Director James K. Kallstrom, *The Twentieth Century With Mike Wallace*, 3 October 1998

Assembling Information

The sources of information used by CIA analysts ultimately included FBI summaries of statements from the 244 eyewitnesses, some containing sight and sound observations, and most containing information that could be used to determine the locations of eyewitnesses at the time of the crash; *DeLorme Version 4.0 Street Atlas USA* commercial mapping software; two sets of radar tracking data (one from a radar at Islip, Long Island, providing data sampled once every 4.6 seconds, the other from a radar at Riverhead, Long Island, providing data sampled once every 12.0 seconds); meteorological data (winds aloft); infrared (heat) data from a US military satellite; the precise times at which the cockpit voice recorder (CVR) and flight data recorder (FDR) ceased operating; the aircraft's location, altitude, speed, and heading at the moment the CVR and FDR ceased operating; the NTSB observation that an abrupt sound was recorded just before the CVR ceased operating; and the NTSB observation that no other unusual activity was recorded on either the CVR or FDR.



Eyewitness locations (CIA graphic). [redacted]

"A lot of people saw things in the sky. And a lot of people saw what we think is the same thing. Those witnesses, they're good people, and they told us what they saw."

—FBI Assistant Director James K. Kallstrom, *Dateline NBC*, 14 March 1997

Because Flight 800's radar transponder, CVR, and FDR ceased operating the instant the aircraft exploded, the altitude history of the aircraft from that time until it hit the water was not known.⁴ It was also unknown how long this took. Radar data showed only the horizontal motion of the plane after it exploded, and this only crudely.

But we did know the precise location of the plane when it exploded, including its altitude (13,800 feet). As it turned out, this information and the fact that the explosion was extraordinarily loud would prove crucial in solving the mystery of the eyewitness "missile sightings."

The Eyewitness Accounts

Although some eyewitness summary reports proved more useful than others, all were analyzed in painstaking detail, a process that took over a year and entailed more than 2,000 man-hours of work.

When conducting our research, we went to places where large numbers of eyewitnesses had been, and also visited specific vantage points of important eyewitnesses. At several of these locations, videotape templates were made to use in our analysis and to provide accurate backdrops for selected scenes in our video. [redacted]

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TWA Flight 800

On the whole, the eyewitnesses provided remarkably detailed descriptions that were surprisingly consistent. The crash scenario depicted in the video was the result of the composite analysis of all the eyewitness reports provided to us by the FBI. [REDACTED]

Most eyewitnesses were about 10 to 12 miles from where the plane first exploded. The statements varied, but many shared common characteristics:

- A patron outside a local restaurant reported seeing what appeared to be a "shooting star" that grew into an oblong ball of flames that fell from the sky. After the flames fell out of sight behind the sand dunes, he heard two "bangs" that sounded like fireworks in the distance.
- A patron at a local yacht club reported seeing what appeared to be a boat flare ascend for several seconds, expand into a much larger fireball, then split into two "smoky trails" which dropped toward the ocean. She then heard deep rumbling sounds.
- A patron at a local marina reported seeing an orange flare rise in the sky and then come down a little before exploding into "two pieces." She reported that the explosion occurred about 10 seconds after she first saw the flare in the sky.
- Two observers near the ocean reported seeing an ascending flare that exploded into an orange fireball, then descended in "two large flaming chunks" to the

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On the whole, the
eyewitnesses provided
remarkably detailed
descriptions that were
surprisingly consistent.
”

ocean's surface. They both reported hearing a "deep thunderous rumble."

- A passenger on a plane reported seeing "a small, flare-like projectile traveling in an east-northeasterly direction" appear in the sky seemingly out of nowhere. It seemed to be ascending, then culminated in a small explosion, followed by a much larger fireball, which appeared to descend toward the water.
- A passenger on a different plane reported seeing an "orange-white flare" ascend, then "bulge" and descend. She likened the ascent and descent to that of a roller-coaster, with the ascent ending in a "big bang," followed by the descent. [REDACTED]

Several eyewitnesses made it clear that they had seen only the latter stages of the disaster:

- One observer in a beachfront condominium reported that he saw a fireball, which separated into two fireballs that fell into the ocean. Immediately after the fireballs hit the water, he heard loud sounds.
- A woman on the beach reported seeing a fiery object falling in two main pieces to the water's surface, followed about four seconds later by a rumbling sound.

- An observer on a small boat reported seeing what at first appeared to be a "shooting star," moving in a "downward, 45-degree sloping arc." He then realized he was observing a burning aircraft. He saw one wing separate from the fuselage, and a large "fire trail" of burning fuel erupt. Just as the wing separated, he heard a loud "concussion" sound. The burning plane and wing then quickly dropped to the water's surface. (Of all the known eyewitnesses on the land and water, this person was the closest.) [REDACTED]

The most useful reports proved to be those that related observations to specific events in either space or time. For example, an eyewitness report of a loud sound "after the fireballs hit the water" was less useful than one of a loud sound "about four seconds after the fireballs hit the water." An eyewitness description of "a flare-like object rising over the ocean" was less useful than a similar description that referenced identifiable landmarks along the beach. An airline passenger's report of a "flare-like object" was less useful than a similar passenger report that included the observation that the flare-like object appeared in the sky about 10 seconds after a small aircraft flew under the plane on which the observer was traveling. [REDACTED]

A few eyewitness reports proved particularly useful. One of the most valuable was from the eyewitness in the beachfront condominium, even though his observations began well after Flight 800 first exploded. His report of loud

The Crash of TWA Flight 800

TWA Flight 800

“
The key to solving the
mystery of the “missile
sightings” was the use of
sound-propagation
analysis...
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sounds just after the fireballs hit the water made it possible to calculate the elapsed time from when the plane first exploded to when it hit the water. From radar data and onboard recordings, we knew where the plane was when it first exploded. Because we also knew where the observer was located, it was possible to calculate how long it took sound to travel from the explosion to the observer (49 seconds). So his statement established that the aircraft exploded about 49 seconds before it hit the water.

Another excellent eyewitness on the land, whose observations began early and included several identifiable reference points, reported that he watched a white light, perhaps a firework, traveling upward at a steep angle with respect to the horizon. The light “zig-zagged” as it rose, and at the apex of its travel “arched over” and disappeared. This observation lasted about 15 seconds. Two or three seconds later, a fireball appeared in the sky near where the white light had disappeared.

The eyewitness specified a landmark—a house near the beach—over which the white light first appeared and a second house behind which the descending fireball disappeared. We determined precisely where the eyewitness was standing, and then measured the line-of-sight angle between the eyewitness and each of the two houses.

Calculations based on the flight path of Flight 800 with respect to this eyewitness show that when the

aircraft first exploded, it was just passing over the house above which the white light first appeared. So the white light the eyewitness described probably was the aircraft briefly ascending and arching over after it exploded, rather than a missile attacking the aircraft.

This eyewitness's visual observations were consistent with the aircraft's known horizontal motion during the 49 seconds which elapsed after the onboard recordings ended. Radar data show that during this time the aircraft traveled about 15 degrees from right to left with respect to this eyewitness—placing it near where the eyewitness claimed the fireball disappeared, behind the second house.

A third important eyewitness was the one in the small boat. Based on his location with respect to where the plane was when it first exploded, analysts were able to calculate that the concussion sound took 42 seconds to reach him. So we knew that the wing separation he observed took place about 42 seconds after the explosion that ended the onboard recordings.

The two distinct trails of fire he described, produced as the plane and wing dropped to the water's surface, were observed by many eyewitnesses and often were

described as appearing immediately after the “flare-like object” considered by some to be a possible missile. But because the trail of fire from the flare-like object culminated in this second explosion, the flare-like object cannot have caused the explosion that ended the onboard recordings—that is, the first explosion. It cannot have been, as some have suggested, a missile attack.

Explaining the “Missile Sightings”

The key to solving the mystery of the “missile sightings” was the use of sound-propagation analysis to establish that eyewitnesses who appeared to have seen a missile “streak up” and cause the plane to explode could not have seen such an occurrence. Once it was established that the aircraft exploded about 49 seconds before it hit the water and that one wing detached (producing two discrete fireballs) about seven seconds before water impact, we could be confident that eyewitnesses describing “streaks” that began just a few seconds before the appearance of the two fireballs could not be describing a missile approaching an intact aircraft. The plane had exploded before their observations began. What they were seeing was a trail of burning fuel coming from the aircraft. Nonetheless, some eyewitnesses interpreted the “streak” produced by the burning fuel as a possible missile. This interpretation no doubt was reinforced in their minds when the streak suddenly culminated in an explosion.

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TWA Flight 800

Other descriptions from eyewitnesses who for whatever reason did not report hearing sounds supported this conclusion. For example, a passenger on USAir Flight 217 reported seeing an aircraft fly under him 10 seconds before the appearance of "a small, flare-like projectile traveling in an east-northeasterly direction." Radar tracking of Flight 217 and the small aircraft—later confirmed to be a Navy P-3 Orion—shows that he first saw the flare-like object at about the time Flight 800's CVR detected an onboard explosion. He also specified where the flare-like object first appeared, which coincided with Flight 800's location when it exploded. And his statement that the flare-like object was traveling in an east-northeasterly direction agrees with the direction that Flight 800 is known to have been traveling when it exploded. So the flare-like object he saw almost certainly was Flight 800 just after it exploded, not a missile.

Another factor corroborating this theory was that eyewitnesses who suspected that they had watched a missile destroy an aircraft were puzzled that they had not actually seen the aircraft before the missile hit it. Considering the lighting conditions at the time—just at sunset—the airliner should have been visible to any observer witnessing a missile approach it. But if burning fuel from the crippled aircraft was what they were seeing—rather than a missile streak—there would be no separate aircraft to see.



Reconstructed wreckage, Calverton, Long Island, 6 February 1997 (CIA photo)

Meteorological Conditions

Because the speed of sound is affected by altitude, wind, and temperature, we had to correct for these meteorological conditions. For example, the speed of sound at the 13,800-foot altitude where Flight 800's CVR and FDR ceased operating was 1,062 ft/sec (without wind). At sea level, it was 1,116 ft/sec (without wind). It averaged 1,089 ft/sec (without wind). Wind slowed the arrival of the sound from the initial explosion as much as 0.9 seconds for some key eyewitnesses compared to when they would have heard the sound without wind. Independent wind-speed calculations were done for each eyewitness claiming to have heard sounds associated with the disaster. Necessary temperature corrections—other than those in the

altitude-sensitive calculations mentioned above—were negligible

Satellite Data

An orbiting sensor on a US satellite detected a heat plume associated with the crash of TWA Flight 800.

Combining timing data derived from the CVR, FDR, and this satellite, along with sound-propagation

The Crash of TWA Flight 800~~SECRET~~
TWA Flight 800

analysis based on observations made by the eyewitness on a small boat, we were able to determine that the aircraft's left wing detached—creating two distinct fireballs—just before the satellite's sensor detected the large heat plume. Although the satellite data corroborated our analysis, it was not crucial to our conclusions. []

The Loud Sound Controversy

Some have questioned why we believe that the loud boom heard by many eyewitnesses corresponded to the initial explosion of the center fuel tank, and how this sound could be heard by eyewitnesses miles away. They suggest that these eyewitnesses, rather than hearing the explosion of the center fuel tank, may have heard the detonation of the warhead of a shoulder-launched surface-to-air missile at or near the position of Flight 800. Or perhaps they heard the launch of such a missile originating from a boat several miles offshore. Others question whether the CVR would capture the sound of a warhead detonation, if one had occurred. Still others question how we could include the observations of eyewitnesses traveling in other aircraft in our analysis, because such eyewitnesses would be unable to hear the sounds heard by several of the eyewitnesses on the land and water. []

To analyze accounts from eyewitnesses who did not report hearing sounds, we used eyewitnesses who did hear sounds to help establish when key events took place, and also to determine the approximate

time that elapsed between these events. We then analyzed other eyewitness statements in the context of this template, and generally found them to be consistent. []

The loud sound almost certainly was produced by the explosion that severed the power source to the CVR and FDR at the beginning of the catastrophe. If the sound had originated near the aircraft at an earlier time, it is likely that it would have been recorded by the CVR. If it originated later, our estimate that the aircraft took about 49 seconds to hit the water after the initial explosion would increase, making it even less likely that any eyewitness saw a missile cause the initial explosion. []

The magnitude of this sound was enormous—loud enough to be described as a "concussion sound" by eyewitnesses more than 11 miles away from where Flight 800 was when its recorders ceased operating, and loud enough to shake a 70-ton bridge at that distance. Based on descriptions by NTSB investigators—including the judgment that the center fuel tank was sealed and contained hot fumes when it exploded, and the judgment that the power source to the CVR and FDR was severed almost immediately by this enormous explosion—a high-energy explosion in this tank appears to be the only plausible source for the initial sound heard by eyewitnesses. []

Concerning the issue of whether the sound could have come from a shoulder-launched surface-to-air

missile, the sound produced by the warhead of such a missile would be roughly equivalent to the sound produced by a handgrenade. Because Flight 800 exploded in thin air nine miles or more from most eyewitnesses, the chance that any eyewitness would have heard such an explosion even if one occurred is remote. And it is inconceivable that such an explosion could create a concussion sound capable of shaking a 70-ton bridge 11 miles away. []

Eyewitnesses probably also could not have heard the launch of such a missile from a boat several miles offshore. The launch of a shoulder-fired missile is quieter than the detonation of its warhead. If such a short-range missile were launched close enough to be heard by eyewitnesses on the shore, it would not have been able to reach Flight 800. And the launch sound would not shake a 70-ton bridge, nor be heard by eyewitnesses up and down the coast of Long Island. If a loud sound associated with the disaster were produced near the shore, it would be heard almost immediately at high intensity by the closest eyewitnesses, and much later and at lower intensity by eyewitnesses several miles away. This would be inconsistent with descriptions given by dispersed eyewitnesses along the shore who all reported hearing a loud concussion sound less than five seconds after the burning debris hit the water. []

Concerning the issue of whether the sound of a missile warhead detonation would have been captured and recorded by the CVR, we can-

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TWA Flight 800

EXCERPTS FROM CONVERSATIONS BETWEEN AN AIR TRAFFIC CONTROLLER,
THE FLIGHT 800 PILOT, AND A PILOT IN THE CRASH VICINITY—17 JULY 1996
(ALL TIMES APPROXIMATE)

8:30:14 p.m., Boston Air Route Traffic Control Center. TWA eight hundred, climb and maintain one five thousand (15,000 feet).

8:30:17. TWA Flight 800: TWA's eight hundred beauty, climb and maintain one five thousand, leaving one three thousand

8:31:12: (TWA Flight 800 explodes at an altitude of 13,800 feet, based on post-crash analysis.)

8:31:50. Eastwind Airlines Flight 507: We just saw an explosion out here on Stinger Bee five oh seven.

8:31:51 (Infrared sensor aboard US [REDACTED] satellite detects large heat source in the vicinity of Flight 800 crash.)

8:31:57. Boston: Stinger Bee five oh seven, I'm sorry. I missed it. Ab, you're on eighteen. Did you say something else?

8:32:00. (TWA Flight 800 hits water, based on post-crash analysis.)

8:32:07. Eastwind 507. We just saw an explosion up ahead of us here something (like) about sixteen thousand feet or something like that. It just went down—to the water.

8:32:56, Boston: TWA eight hundred, (call) Center.

8:33:04, Boston: TWA eight hundred, Center.

8:33:09, Boston: TWA eight hundred, if you hear Center (identify).

8:33:17, Boston: Stinger Bee, ah, five zero seven, you reported an explosion, is that correct, sir?

8:33:21, Eastwind 507: Yes sir, about, ah, five miles at my eleven o'clock here.

8:33:48. Eastwind 507: (unintelligible) Stinger Bee, ah (unintelligible) Boston, we are directly over the site where that airplane or whatever it was just exploded and went into the water. (Then, from a second operator...) (unintelligible) eighteen, ah, nineteen miles on the two thirty-six radial (unintelligible) Hampton.

8:34:01, Boston: Roger that. Thank you very much, sir, we're investigating that right now. TWA eight hundred, Center. TWA eight zero zero, if you hear Center, ident.

8:35:36, Boston: TWA eight hundred, Center.

8:35:43, Eastwind 507: I think that was him.

8:35:45, Boston: I think so.

8:35:48, Eastwind 507: God bless him.

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The Crash of TWA Flight 800

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TWA Flight 800

8:36:57, Boston: Stinger Bee five oh seven, thanks for that report. ah, New York on one three three point zero five (133.05 MHz). Good day, sir.

8:37:05, Eastwind 507: Thirty-three oh five, so long Stinger five oh seven. Anything we can do for you before we go?

8:37:11, Boston: Well, I just want to confirm that, ah, that you saw the, ah, splash in the water approximately, ah, twenty (20 miles) southwest of Hampton, is that right?

8:37:20, Eastwind 507: Ah, yes sir. It, it blew up in the air, and then we saw two fireballs go down to the, to the water and there was a big (unintelligible) smoke form, ah, coming up from that. Also, ah, there seemed to be a light. I, I thought it was a landing light (unintelligible) it was coming right at us at, about. I don't know, about fifteen thousand feet or something like that, and I pushed my landing lights, ah, you know, so I saw him, and then it blew.

8:37:40, Boston: Roger that, sir. ah, that was a seven forty-seven out there you had a visual on that. Anything else in the area when it happened?

8:37:47, Eastwind 507: I didn't see anything. He seemed to be alone. I thought he had a landing light on. Maybe it was a fire, I don't know.

8:37:52, Boston: Stinger Bee five oh seven. ah, roger that. Anything else comes to your mind. ah, you can use your other radio, come back to this frequency and tell me about it.

8:37:59, Eastwind 507: That's all I can think of at this time.

The Eastwind Airlines pilot, Capt. David McClaine, first reported an "explosion" about 40 seconds after Flight 800's CVR and FDR ceased operating. He most likely was reporting the conflagration produced when Flight 800's left wing detached—producing two "fireballs"—roughly seven seconds before the burning debris hit the water. This large heat source was detected by an infrared sensor aboard a US military satellite just after McClaine made his first report. [redacted]

The "landing light" he reported seeing earlier probably was a fire produced after the initial explosion and described by some eyewitnesses on the ground as a "streak of light in the sky" that preceded Flight 800's "explosion." It was this "streak of light" that led some people to think that a missile was used to shoot down Flight 800. [redacted]

Based on sound-propagation analysis—juxtaposing what eyewitnesses saw with what they heard—CIA analysts concluded that this "streak of light" was, in fact, a trail of burning fuel from the Boeing 747 after the first explosion had already occurred, not a missile. [redacted]

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TWA Flight 800

not be certain that such a sound would have been recorded. It also is not relevant to our conclusion that the eyewitnesses saw only the burning aircraft, not a missile. Unless such a warhead detonation occurred well before the center fuel tank exploded, produced an enormously loud sound, and created warhead fragments that traveled faster than the speed of sound for a long time (so they caused the center fuel tank to explode before the warhead sound could be recorded by the CVR), this scenario would not change CIA's conclusion that the eyewitness observations took place after the aircraft exploded.

Any eyewitness who thinks he may have seen a missile shoot down Flight 800 needs to have seen something that occurred more than 42 seconds before the aircraft broke into "two distinct fireballs" and more than 49 seconds before the plane hit the water. CIA analysts are not aware of any eyewitness who did.

Final Observations

Analysts often have to make judgments based on limited and highly conflicting information. This was not the case for our assessment of the eyewitness reports associated with the crash of TWA Flight 800. On the whole, the corroborative evidence that the eyewitnesses saw only the burning aircraft without realizing it, and not a missile, was extensive and compelling.

Nevertheless, a few people, driven by what they perceive to be an overwhelming number of eyewitnesses who "saw" a missile attack the plane, persist in thinking otherwise. Confident that so many eyewitnesses cannot be "wrong," they have concluded that the government, for whatever reason, is covering up the true cause of the crash.

These people probably are simply reading more into the eyewitness descriptions than is warranted. Nonetheless, they are likely to cling to their theories. The crash drew worldwide attention and did not have an immediate explanation. Such situations almost always give rise to suspicion and conjecture.

Despite the reservations of skeptics, the work of Agency analysts evidently helped many better understand the eyewitnesses' observations. In a letter to the Director of Central Intelligence dated 17 July 1998—the second anniversary of the crash—Congressman James A. Traficant, Jr., a member of the House Transportation and Infrastructure Subcommittee on Aviation, recognized that work:

I want to extend my gratitude to those Central Intelligence Agency employees who worked on the analysis of the eyewitness statements. Their work was extremely helpful in the effort to unravel the Flight 800 mystery and in addressing the controversy surrounding the eyewitness testimony. I think it would be extremely beneficial if the CIA undertook an effort to better edu-

cate the American people on the work the Agency did on the eyewitness analysis.

Notes

1. All air traffic control communications cited in this article were recorded at the Boston Air Route Traffic Control Center on the evening of 17 July 1996 and subsequently released to the public by the Federal Aviation Administration. (1)

2. In mid-January 1997, CIA analysts decided to document their work in an animated video. The CIA analysts and their line managers agreed that such a production was needed to make a convincing case to non-technical audiences that eyewitnesses had seen only the burning aircraft. On 11 February 1997, CIA senior managers gave final approval and allocated the necessary funding.

Eventually, this video or segments of it would be seen by several hundred million people worldwide. Most responses, including comments from several family members of the crash victims, were favorable. But some were not. A few people even suggested that the video was fabricated as part of a government coverup of the true cause of the tragedy.

3. Late on 30 December 1996, CIA analysts first realized that eyewitnesses probably had observed only the burning aircraft in various stages of crippled flight. The following morning, this conclusion was phoned to the FBI. It took about five more weeks, however, for CIA analysts to document a case solid enough to be formally briefed to the FBI. This briefing was given in New York on 6 February 1997. Details were provided in writing on 23 March 1997 in a memorandum from the CIA's Deputy Director for Intelligence to

The Crash of TWA Flight 800

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TWA Flight 800

FBI Assistant Director James Kallstrom. On 18 June 1997, CIA analysts briefed their results in New York to Kallstrom and about 30 others from the FBI and the Army's Missile and Space Intelligence Center (MSIC). They also showed an early version of their video (*TWA Flight 800: What Did the Eyewitnesses See?*) at this time. On 22 October 1997, CIA analysts briefed Kallstrom in New York again and showed him a more finished version of the video. He expressed his appreciation for CIA's help and his desire to use the CIA video the following month at his news conference announcing the suspension of the criminal investigation. CIA concurred and prepared the video for public release. []

4. Had Flight 800's CVR and FDR continued to operate after the initial explosion, the crash investigation would have been simplified considerably. []

CVRs have been required since 1967 on all commercial airliners. They typically use a 30-minute, continuous-loop, 4-track tape that records sounds detected by four microphones, one in each pilot's headset, one in the instrument console, and one in the center of the cockpit designed to monitor overall sounds. The CVR often is the most useful source of information to determine the general cause of a crash, but rarely reveals the precise cause. []

In addition to providing dialogue and comments from the pilot, co-

pilot, and crew, the CVR serves other vital functions. Analysis of sounds recorded by its multiple microphones can be used to determine if sirens or alarms were activated, or if there was an explosion. If an explosion occurred, CVR analysis can help locate its source. []

FDRs have been required since 1958 on all commercial airliners. They typically use a 25-hour continuous-loop tape that records precise flight conditions and diagnostic information on the operation of at least 29 of the aircraft's critical subsystems. These include thrust from each engine, altitude, air speed, compass heading, vertical speed, horizontal speed, pitch, and roll. Analysis of these data is more time-consuming and specialized than analysis of the CVR data, but usually provides vital clues concerning the specific reason for a crash. []

Because the CVR and FDR are in the tail section of the plane (to maximize survivability) and the power source is in the front, power can be severed in the event of a breakup of the fuselage. On 52 occasions in the past 16 years, power failure has resulted in lost CVR or FDR data. In the case of TWA Flight 800, power to both the CVR and FDR was severed when the center fuel tank exploded. This contributed to the extraordinary difficulty and expense of that crash investigation. []

5. Had Flight 800 gone down two to three miles farther offshore, the sound of the initial explosion would have reached the nearest observers on shore 10 to 15 seconds later than it did. This would have made the sound-propagation analysis considerably less conclusive, because the plane would have hit the water well before the first sound reached the shore. []

As it turned out, the plane exploded about 10 miles offshore and hit the water about 49 seconds later. Just as sound from the explosion was reaching the closest eyewitnesses on the shore. This coincidence permitted sound propagation analysis to be applied effectively, because analysts could use it to establish that so-called missile sightings described as occurring shortly before the fireballs appeared and plunged into the water took place well after the plane had already exploded. []

6. For example, an NBC *Dateline* poll of 503 Americans taken on 14 March 1997 showed that 48 percent believed that the government was covering up the real cause of the crash. []

7. Although many eyewitnesses described seeing something akin to a flare or firework traverse the sky and culminate in an explosion, the vast majority of them did not refer to what they saw as a "missile." They repeatedly used the descriptive terms "flare" and "firework." []

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